

REMARKS

Reconsideration of the application in view of the above amendments and the following remarks is requested. Claims 14-20 and 22-29 are in this application. Claims 14-19, 22-23, and 26-28 have been amended. Claims 1-13 and 21 have been cancelled.

The Examiner rejected claim 15 under 35 U.S.C. §112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. Specifically, the Examiner argued that the phrase "the second etching" in line 1 of the claim lacks sufficient antecedent basis.

Applicant disagrees that the phrase "the second etching" lacks the definiteness required by section 112 since claim 14 recites only two etching steps. However, to further prosecution, claim 15 has been amended to recite the specific step, and is believed to satisfy the requirements of the second paragraph of section 112.

The Examiner rejected claims 14-15, 21-22, and 24 under 35 U.S.C. §102(e) as being anticipated by Yang et al. (U.S. Patent No. 6,495,469). For the reasons set forth below, applicant respectfully traverses this rejection as applied to the amended claims.

Claim 14 has been amended and recites, in part,

"etching the layer of insulation material to form a plurality of trenches in the layer of insulation material, the top surface of the layer of insulation material having a trench region that lies between adjacent trenches, each trench having a bottom surface vertically spaced a first distance apart from the top surface; and

"etching the layer of insulation material and the plurality of trenches to lower the top surface of the layer of insulation material in the trench region to form a trench surface that lies below and parallel to the top surface, and to lower the bottom surface of each trench such that each bottom surface is

vertically spaced a second distance apart from the top surface, the second distance being greater than the first distance.”

In rejecting the claims, the Examiner pointed to FIGS. 1-5 of Yang as teaching the steps of the present invention. The Yang reference, however, fails to teach or suggest that the second etch step lowers the bottom surface of each trench as required by amended claim 14.

As shown in FIG. 2, Yang teaches that the first etch step forms via openings 30 that expose spaced-apart metal structures 12. However, as shown in FIG. 5, although Yang teaches that the second etch step lowers the top surface, Yang totally fails to teach or suggest that the second etch step lowers the bottom surfaces of the via openings 30. As shown in FIGS. 2 and 5, the bottom surfaces of the via openings 30 are the same before and after the second etch.

Thus, since the Yang reference fails to teach a second etch step that lowers the bottom surfaces of the trenches, claim 14 is not anticipated by Yang. In addition, since claim 15, which was amended to clarify the claim, depends from claim 14, claim 15 is not anticipated by Yang for the same reasons as claim 14.

Claim 22 has been amended, in part, to include the limitations of independent claim 21, and recites:

“etching the layer of insulation material to form a first trench in the layer of insulation material, the first trench having a first bottom surface vertically spaced a first distance apart from the top surface; and

“etching the layer of insulation material and the first trench to form a second trench in the layer of insulation material, the second trench having a second bottom surface vertically spaced a second distance apart from the top surface, and a third bottom surface vertically spaced a third distance apart from the top surface, the third distance being greater than the first distance, the third distance being greater than the second distance.”

Thus, claim 22 requires that the third distance be greater than the first distance. As noted above, Yang fails to teach or suggest that the second etch step

lowers the bottom surfaces of the via openings 30. As a result, it is not possible for the third distance to be greater than the first distance.

Therefore, since the Yang reference fails to teach a third distance that is greater than a first distance, claim 22 is not anticipated by Yang. In addition, since claim 24 indirectly depends from claim 22, claim 24 is not anticipated by Yang for the same reasons as claim 22.

The Examiner also rejected claims 16, 18-19, 23, and 27-28 under 35 U.S.C. §103(a) as being unpatentable over Yang et al. in view of Chittipeddi et al. (U.S. Patent No. 6,417,087). In rejecting the claims, the Examiner argued that Yang disclosed all of the limitations, pointing to the Chittipeddi reference as disclosing a conductive region that has a top surface substantially planar with the top surface of the layer of insulation material.

However, as noted above, the Yang reference does not teach or suggest the limitations of independent claims 14 and 22. As a result, claims 16 and 18-19, which depend either directly or indirectly from claim 14 and have been amended to clarify the invention, are patentable over Yang in view of Chittipeddi for the same reasons that claim 14 is not anticipated by Yang. In addition, claims 23 and 27-28, which depend either directly or indirectly from claim 22 and have been amended to clarify the invention, are patentable over Yang in view of Chittipeddi for the same reasons that claim 22 is not anticipated by Yang.

The Examiner additionally rejected claims 20 and 29 under 35 U.S.C. §103(a) as being unpatentable over Yang et al. in view of Chittipeddi et al. as applied above, and further in view of Braeckelmann (U.S. Patent No. 6,218,302). However, since the Yang reference does not teach or suggest the limitations of independent claims 14 and 22, claims 20 and 29, which indirectly depend from claims 14 and 22, respectively, are patentable over Yang in view of Chittipeddi and further in view of Braeckelmann for the same reasons that claims 14 and 22, respectively, are not anticipated by Yang.

The Examiner further rejected claims 17 and 25-26 under 35 U.S.C. §103(a) as being unpatentable over Yang et al. in view of Chittipeddi et al. as applied above, and further in view of Katoh (U.S. Patent No. 5,986,346). However, since the Yang reference does not teach or suggest the limitations of independent claims 14 and 22, claims 17 and 25-26, which depend indirectly from claims 14 and 22, respectively, (claims 17 and 26 were amended to clarify the invention) are patentable over Yang in view of Chittipeddi and further in view of Katoh for the same reasons that claims 14 and 22, respectively, are not anticipated by Yang.

Thus, for the foregoing reasons, it is submitted that all of the claims are in a condition for allowance. Therefore, the Examiner's early re-examination and reconsideration are requested.

Respectfully submitted,

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